Math 357
Short quiz 09

2024–02–23 (F)

Your name: _____

Let $C_4 = \langle g \mid g^4 = 1 \rangle$ be the cyclic group of order 4 with generator g. For each of the following maps, state whether it is a matrix representation of C_4, and if so, whether it is faithful.

$$\rho_1 : C_4 \to GL_1(\mathbf{C}) \qquad \rho_2 : C_4 \to GL_2(\mathbf{C}) \qquad \rho_3 : C_4 \to GL_3(\mathbf{C})$$

$$g^j \mapsto (1) \qquad g^j \mapsto \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}^j \qquad g^j \mapsto \begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & i \end{pmatrix}^j$$